



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/516,508	04/21/2005	Sei Aoki	Q85110	6977
23373 7590 03/31/2008 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037				
EXAMINER				
RONESL VICKERY M				
ART UNIT		PAPER NUMBER		
1796				
MAIL DATE		DELIVERY MODE		
03/31/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/516,508

Applicant(s)

AOKI ET AL.

Examiner

VICKEY RONESI

Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SE/US)
Paper No(s)/Mail Date 12/10/04 and 12/5/05
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____

DETAILED ACTION

Oath/Declaration

1. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because: the priority date for JP 2002/161778 is incorrect. Specifically, the date of 02/06/02 should be 03/06/02.

Claim Objections

2. Claims 2 and 11 are objected to because of the following reasons:

With respect to claim 2, it is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Specifically, the filler in claim 2 “includes” (open-ended claim language” carbon fibers

With respect to claim 11, the term “filler” is used to refer to two sets of fillers. It is suggested that different language be used to distinguish between the two “fillers.”

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Art Unit: 1796

3. Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claim 3, the term “(bridge free)” is indefinite because it is not made clear if “bridge-free” further narrows “knotless” or is only defining “knotless.”

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-10, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP ‘677 (EP 1 243 677) in view of Snyder et al (US 5,707,916).

EP ‘677 discloses a carbon fiber product prepared from bottomless cups with edges of hexagonal carbon exposed on at least part of an outer and inner surface (abstract), wherein the area of the exposed part of the edges of the hexagonal carbon layers is 2% or greater (paragraph 0014), the edges are irregular on an atomic level (paragraphs 0015 and 0016), and the fibers are not graphitized even if the carbon fiber is subjected to a heat treatment at a temperature of 2500°C or more (paragraph 0019). The fibers can have a length of up to several tens of microns (paragraph 0088) and a diameter of about 100 nm (paragraph 0061) and are used in rubbers for tires (paragraph 0125).

EP ‘677 fails to disclose the amount of carbon fiber in the rubber.

Snyder et al discloses carbon nanofibers (col. 2, lines 17-34) which are useful in elastomers in combination with carbon black or silica for use in tires (col. 3, lines 1-5), wherein the amount of carbon fibers is less than 50 parts by volume to provide for improved mechanical reinforcement properties (col. 3, lines 18-25). It is the examiner's position that the amount of carbon fibers in volume overlaps with the presently claimed parts by weight amount given that the carbon fibers (ρ = about 1.5 g/cc) have a higher density than polymers (ρ = about 1 g/cc) and would provide for parts by mass amounts of greater than 50.

Given that EP '677 teaches the use of carbon fiber product in a rubber composition for tires and further given that Snyder et al teaches suitable amounts of carbon nanofiber in rubber composition for tires, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the amounts taught by Snyder et al in order to provide for improved reinforcement properties.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

5. Claims 1-10, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanagisawa et al (US 7,018,601) in view of Snyder et al (US 5,707,916).

Yamagisawa et al discloses a carbon fiber product prepared from bottomless cups with edges of hexagonal carbon exposed on at least part of an outer and inner surface (abstract), wherein the area of the exposed part of the edges of the hexagonal carbon layers is 2% or greater (col. 2, lines 41-42), the edges are irregular on an atomic level (col. 2, lines 43-51), and the fibers

are not graphitized even if the carbon fiber is subjected to a heat treatment at a temperature of 2500°C or more (col. 3, lines 1-3). The fibers can have a length of up to several tens of microns (col. 7, lines 40-42) and a diameter of about 100 nm (col. 5, line 35) and are used in rubbers for tires (col. 10, lines 38-43).

Yanagisawa et al fails to disclose the amount of carbon fiber in the rubber.

Snyder et al discloses carbon nanofibers (col. 2, lines 17-34) which are useful in elastomers in combination with carbon black or silica for use in tires (col. 3, lines 1-5), wherein the amount of carbon fibers is less than 50 parts by volume to provide for improved mechanical reinforcement properties (col. 3, lines 18-25). It is the examiner's position that the amount of carbon fibers in volume overlaps with the presently claimed parts by weight amount given that the carbon fibers (ρ = about 1.5 g/cc) have a higher density than polymers (ρ = about 1 g/cc) and would provide for parts by mass amounts of greater than 50.

Given that Yanagisawa et al teaches the use of carbon fiber product in a rubber composition for tires and further given that Snyder et al teaches suitable amounts of carbon nanofiber in rubber composition for tires, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the amounts taught by Snyder et al in order to provide for improved reinforcement properties.

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of

invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

6. Claims 1-10, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Endo et al ("Structural Characterization of Cup-Stacked-Type Nanofibers with an Entirely Hollow Core", *Applied Physics Letters*, **80**:70, pp. 1267-1269) in view of Snyder et al (US 5,707,916)..

Endo et al discloses cup-stacked-type nanofibers with an entirely hollow core for use in composite materials (page 1267, end of 1st paragraph in col. 1), wherein the nanofibers contain a hollow core and open edges at the outer surface (page 1267, 1st paragraph in col. 1). Endo et al teaches that the nanofibers are graphitized at 3000°C (page 1267, col. 1, 2nd paragraph) and this suggests that the nanofibers remain ungraphitized at 2500°C given that if the nanofibers could be graphitized at lower temperatures, Endo et al would have used lower temperatures in order to save energy. Endo et al teaches that the carbon fiber has large portion of open edges, it is considered that the carbon fiber of Endo et al intrinsically overlaps with the claimed amount of at least 2% or more exposed. The carbon fiber has a diameter of 50-150 nm and length up to 200

microns (page 1267, 1st full paragraph in col. 2). While the carbon fibers are not produced by a vapor phase epitaxial growth method, it is noted that this is product-by-process limitation and therefore “even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” See *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Because it is not made clear how a carbon fiber prepared from a floating reactant method is different from one prepared from the presently claimed vapor phase epitaxial growth method, the carbon fiber taught by Endo et al reads on the presently claimed carbon fiber, absent evidence to the contrary. It is noted that the exposed face of Endo et al’s carbon fiber necessarily has irregularities on an atomic level given that the growth mechanism has not been shown to be exactly and perfectly precise.

While Endo et al teaches the use of its carbon fiber in composites, it fails to disclose a rubber composite with the carbon fiber.

Snyder et al discloses carbon nanofibers (col. 2, lines 17-34) which are useful in elastomers in combination with carbon black or silica for use in tires (col. 3, lines 1-5), wherein the amount of carbon fibers is less than 50 parts by volume to provide for improved mechanical reinforcement properties (col. 3, lines 18-25). Snyder et al teaches that the fibers allow more oil to be added into a tire and provide improved mechanical properties (col. 3, lines 1-16). It is the examiner’s position that the amount of carbon fibers in volume overlaps with the presently claimed parts by weight amount given that the carbon fibers (ρ = about 1.5 g/cc) have a higher

density than polymers (ρ = about 1 g/cc) and would provide for parts by mass amounts of greater than 50.

Given that Endo et al teaches the use of carbon fiber product in composite materials and further given that Snyder et al teaches suitable amounts of carbon nanofiber in rubber composition for tires provides for improved properties, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the carbon fiber of Endo et al in a rubber composition for a tire in order to improve the properties of the tire.

7. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over either EP '677 (EP 1 243 677), Yanagisawa et al (US 7,018,601), or Endo et al ("Structural Characterization of Cup-Stacked-Type Nanofibers with an Entirely Hollow Core", *Applied Physics Letters*, **80**:70, pp. 1267-1269) in view of Snyder et al (US 5,707,916) and further in view of Verthe et al (US 5,718,781).

The discussion with respect to EP '677, Yanagisawa et al, Endo et al, and Snyder et al in paragraphs 4-6 above is incorporated here by reference.

While Snyder et al teaches the use of carbon fibers in a tire, it fails to teach the use of silica or carbon black with carbon fibers in a rubber composition intended to a tire (col. 3, lines 1-5), it fails to disclose the amount of silica or carbon black.

Verthe et al discloses a rubber composition for use in a tire and teaches that suitable amounts to provide desirable reinforcement and electrical properties are 25-85 phr (parts per hundred parts rubber) silica, 5-15 phr carbon fibers and up to 30 phr carbon black (abstract, col. 3, line 56 to col. 4, line 40).

Given that Snyder et teaches the use of carbon fibers with carbon black and silica and further given that Verthe et al teaches suitable amounts of silica and carbon black in order to provide for a desirable combination of mechanical and electrical properties, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the amounts of silica and carbon black as taught by Verthe et al in order to obtain a rubber composition suitable for use in a tire containing carbon fibers made from bottomless cup-shaped carbon network layers.

Conclusion

8. The following references from International Search Report for PCT/JP03/06948 have been considered but have not been used in the prior art rejections above for the following reasons:

- The US equivalent of JP 2003-147644 has been relied upon above (US 7,018,601).

- Translations of “Carbon nanotube Gunze Sangyo ga Ryosen e” and “Nano ni Idomu Kenkyusha Interview” were not provided. Translations have been ordered by the examiner.

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 2005/0250895 discloses rubber composite material comprising graphite nanofibers with a multifaceted tubular structure in a rubber (paragraphs 0028-0030), however, the disclosure regarding the rubber or any polymeric material fails to qualify as prior art given that the priority (CIP) documents do not provide support for polymeric material.

Art Unit: 1796

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vickey Ronesi whose telephone number is (571) 272-2701. The examiner can normally be reached on Monday - Friday, 8:30 a.m. - 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

3/27/2008

vr

/Vickey Ronesi/
Examiner, Art Unit 1796